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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,988	08/04/2003	Seong Ho Kang	YHK-0115	2974

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EXAMINER	
BODDIE, WILLIAM	
ART UNIT	PAPER NUMBER
2629	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/632,988	KANG ET AL.	
	Examiner	Art Unit	
	William L. Boddie	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,4-7,9-11,13-15 and 20-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,4-7,9-11,13-15 and 20-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 18 January 2006 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. In an amendment dated December 6th, 2006, the Applicant amended claim 1. Currently claims 1, 4-7, 9-11, 13-15 and 20-22 are currently pending.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on December 6th, 2006 has been entered.

Response to Arguments

3. On page 9 of the Remarks, the Applicants claim that the newly added limitation was indicated by the Examiner as being sufficient to patentably distinguish the claim over the cited references. The Examiner respectfully disagrees.

4. The Applicant is pointed to the "Examiner's Interview Summary Record" dated 11/9/06. In the summary it was stated that "should the current claims include limitations reciting a sustain period that is independent of temperature" this would overcome the current rejections. However, in the newly added limitation it is only required that the *number of sustain pulses* within the sustain period be independent of temperature. As such the broadest reasonable interpretation of such a limitation still allows for the length of the sustain period to be dependent upon temperature. In short, the sustain period as

currently claimed can still be dependent upon temperature, and therefore does not overcome the previously cited rejection. Applicant is pointed to further discussion below, as to how Awamoto discloses, the newly added limitations.

5. As to the additional independent claims, these rejections are still seen as proper and are thus maintained.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 4-7, 9-10 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awamoto et al. (US 6,720,940) in view of applicant's admitted prior art (figures 3 and 5, hereinafter referred to as APA).

With respect to claim 1, Awamoto discloses, a method of driving a plasma display panel using frames, each frame divided into a plurality of sub-fields, comprising (fig. 6):

applying a first driving waveform to said sub-fields at a temperature at a first prescribed temperature (T1'+Ti1 ... T8'+Ti8 in fig. 6); and

applying a second driving waveform different from the first driving waveform to said sub-fields at a second prescribed temperature, the first and second prescribed temperature being different (T1' ... T2' in fig. 6; also note col. 8, lines 16-24),

wherein each of said sub-fields includes a plurality of periods (TR,TA,TS in fig. 12), one of the periods being an initialization period (TR in fig. 12), which is divided into a set-up interval for forming wall charges at a discharge cell (Prx in fig. 12) and a set-down interval for erasing a portion of the wall charges formed in the set-up interval (col. 2, lines 25-28).

wherein each of the sub-fields includes a sustain period (32, 16, 8 etc. in fig. 6) and wherein a number of sustain pulses in the sustain period of each sub-field is independent of a temperature (first note, that between (B) and (C) of fig. 6 there are the same number of sustain pulses) of the plasma display panel (the reason for the lowering of the number of the sustain pulses from (A) to (B) is due to the display load factor exceeding 20%; Awamoto is quite clear on this fact. See col. 8, lines 1-32; temperature is only a factor in whether halt periods are inserted; the number of pulses is purely dependent upon the display load factor.).

Awamoto does not expressly disclose, that the set-up interval waveforms are different from each other, while waveforms applied in the other periods are substantially identical to each other.

APA discloses, wherein waveforms applied in the set-up interval of the first and second driving waveforms are different from each other while the waveforms applied in the other periods are substantially identical to each other (note the different set-up periods of figs. 3 and 5, both of which are admitted prior art).

Awamoto and APA are analogous art because they are both from the same field of endeavor namely, driving waveforms for plasma displays.

At the time of the invention it would have been obvious to apply different waveforms in the set-up interval while applying substantially identical waveforms in other periods, as taught by APA, to the driving waveforms of Awamoto. To further explain, Awamoto discloses, applying different waveforms based on the panel temperature. Applicant admits prior art for two different set-up waveforms. One waveform, while improving contrast, causes brightness misfires at certain temperatures. It seems obvious that one of ordinary skill in the art at the time would have thought to also alter the set-up waveforms of Awamoto depending on the panel temperature.

The motivation for doing so would have been to improve the contrast of the display (APA, para. 20) and to reduce brightness misfires (APA, para. 33).

With respect to claim 4, Awamoto and APA disclose, the method as claimed in claim 1 (see above).

While Awamoto does not expressly disclose, the steps of:

applying a rising ramp waveform to a scan electrode provided at each discharge cell during the set-up interval when said first driving waveform is supplied;

applying a ground voltage to a common sustain electrode provided, in parallel with the scan electrode, at each discharge cell in the first half of the set-up interval; and

floating the sustain electrode in the second half of the set-up interval.

APA discloses such a waveform in figure 5, with rising ramp (Ramp-up) and ground voltage and floating (Z set-up period).

Therefore it would have been obvious to replace the waveforms of Awamoto with the driving waveform of APA for the benefit of improved contrast (APA, para. 20).

With respect to claim 5, Awamoto and APA disclose, the method as claimed in claim 1 (see above).

While Awamoto does not expressly disclose, the steps of:

Applying a rising ramp waveform to a scan electrode provided at each discharge cell during the set-up interval when said second driving waveform is supplied and

Applying a ground voltage to a common sustain electrode provided, in parallel with the scan electrode, at each discharge cell.

APA discloses such a waveform in figure 3, with rising ramp (Ramp-up) and ground voltage (Z set-up period).

Therefore it would have been obvious to replace the waveforms of Awamoto with the driving waveform of APA for the benefit of reduction of brightness misfires (APA, para. 33).

With respect to claim 6, Awamoto and APA disclose, the method as claimed in claim 1 (see above).

While Awamoto does not expressly disclose wherein said second prescribed temperature is within a range of temperature is 20° C. to –50° C, this further limitation is merely a design choice and would have been an obvious temperature range choice as this is approximately the range that a brightness misfire is likely to occur at when using conventional drive waveforms (APA, para. 33).

With respect to claim 7, Awamoto discloses, a method of driving a plasma display panel using frames, each frame being divided into a plurality of subfields, an initialization period included in each sub-field is divided into a set-up interval (Prx in fig

.12) and a set-down interval for its driving (col. 2, lines 25-28), comprising the steps of displaying a picture on the panel (this is an inherent outcome of using the plasma display panel); sensing a driving temperature of the panel; and setting a driving waveform to be applied in the set-up interval in correspondence with said driving temperature of the panel (col. 8, lines 16-24),

wherein a first driving waveform supplied when said driving temperature of the panel is a first prescribed temperature is different form a second driving waveform supplied when said driving temperature of the panel is a second prescribed temperature, which is different from the first prescribed temperature (fig. 6, in which B and C are different frames caused by a sensed temperature; also note col. 8, lines 16-24), and

wherein each of said sub-fields includes a plurality of periods (TR,TA,TS in fig. 12), one of the periods being an initialization period (TR in fig. 12).

Awamoto does not expressly disclose, that specifically the set-up interval waveforms are different from each other, while waveforms applied in the other periods are substantially identical to each other.

APA discloses, wherein waveforms applied in the set-up interval of the first and second driving waveforms are different from each other while the waveforms applied in the other periods are substantially identical to each other (note the different set-up periods of figs. 3 and 5, both of which are prior art).

At the time of the invention it would have been obvious to apply different waveforms in the set-up interval while applying substantially identical waveforms in

other periods, as taught by APA, to the driving waveforms of Awamoto. To further explain, Awamoto discloses, applying different waveforms based on the panel temperature. Applicant admits prior art for two different set-up waveforms. One waveform, while improving contrast, causes brightness misfires at certain temperatures. It seems obvious that one of ordinary skill in the art at the time would have thought to also alter the set-up waveforms of Awamoto depending on the panel temperature.

The motivation for doing so would have been to improve the contrast of the display (APA, para. 20) and to reduce brightness misfires (APA, para. 33).

With respect to claim 9, Awamoto and APA disclose, the method as claimed in claim 7 (see above), and altering the driving waveform in response to panel temperature.

Awamoto does not expressly disclose the steps of:

applying a rising ramp waveform to a scan electrode provided at each discharge cell during the set-up interval; and

applying a ground voltage to a common sustain electrode provided, in parallel with the scan electrode, at each discharge cell during the set-up period.

APA discloses such a waveform in figure 3, with rising ramp (Ramp-up) and ground voltage (Z set-up period).

Therefore it would have been obvious to replace the waveforms of Awamoto with the driving waveform of APA for the benefit of reduction of brightness misfires (APA, para. 33).

With respect to clam 10, Awamoto discloses, the method as claimed in claim 8 (see above), and altering the driving waveform in response to panel temperature.

Awamoto does not expressly disclose the steps of:

applying a rising ramp waveform to a scan electrode provided at each discharge cell during the set-up interval; and

applying a ground voltage to a common sustain electrode provided, in parallel with the scan electrode, at each discharge cell; and

floating the sustain electrode in the second half of the set-up interval.

APA discloses such a waveform in figure 5, with rising ramp (Ramp-up) and ground voltage and floating (Z set-up period).

Therefore it would have been obvious to replace the waveforms of Awamoto with the driving waveform of APA for the benefit of improved contrast (APA, para. 20).

With respect to claims 20-21, the only additional limitation these claims present over their independent claims is that the first temperature is higher than the second temperature. Awamoto clearly states that one temperature range is higher than a preset value and one range is below that same preset value (col. 7, lines 3-8).

8. Claims 11, 13-15 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awamoto et al. (US 6,720,940) in view of Nagai (US 6,011,355) and further in view of applicant's admitted prior art (figures 3 and 5, hereinafter referred to as APA).

With respect to claim 11, Awamoto discloses, a driving apparatus for a plasma display panel in which an initialization period included in each sub-field is divided into a

set-up interval (Prx in fig. 12) and a set-down interval (remainder of TR in fig. 12) for its driving, comprising:

a temperature sensor for sensing a driving temperature of the panel (75 in fig. 3);

a controller (69, 61 in fig. 3) for controlling a turning-on and a turning-off of an interval setting device (71 in fig. 3) in correspondence with a temperature inputted from the temperature sensor (71,72 and 61 in fig. 3),

wherein said controller differently controls said turning-on and turning-off of the interval setting device (71 in fig. 3) when a driving temperature inputted from the temperature sensor is a first prescribed temperature and when a driving temperature inputted from the temperature sensor is a second prescribed temperature, the first and second temperatures being different (clear from operation of device, also see col. 7, lines 1-17).

Awamoto does not expressly disclose, a switching device provided between a plurality of common sustain electrodes provided at the panel and a ground voltage source, or that the set-up intervals are different from each other amongst the waveforms.

Nagai discloses, a switching device (28 in fig. 1), turned on and off by a controller (107A in fig. 4), provided between a plurality of common sustain electrodes (X in fig. 1) provided at the panel and a ground voltage source (clear from fig. 1).

APA discloses, wherein waveforms applied in the set-up interval of the first and second driving waveforms are different from each other while the waveforms applied in

the other periods are substantially identical to each other (note the different set-up periods of figs. 3 and 5, both of which are prior art).

Nagai, APA and Awamoto are analogous art because they are all from the same field of endeavor namely, plasma displays driving methods.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the interval switching device of Awamoto with the switching device, disclosed by Nagai.

The motivation for doing so would have been to hold the sustain electrodes at a ground level (Nagai, col. 12, lines 19-20).

At the time of the invention it would have been obvious to one of ordinary skill in the art to apply a different set-up interval while applying substantially identical waveforms in other periods, as taught in the waveforms of the APA, to the waveforms of Awamoto and Nagai.

The motivation for doing so would have been to reduce the chance of noise affecting the electrodes, and to improve the contrast (APA, para. 20).

With respect to claim 13, Awamoto, APA and Nagai disclose, the driving apparatus as claimed in claim 11 (see above). They also disclose as shown above in claim 11 limitations, using the timing controller of Awamoto to control the switching device of Nagai.

Awamoto and Nagai do not expressly disclose the times at which the switching device is turned on and off, thereby floating the common sustain electrode when a driving temperature inputted from the temperature sensor is more than said low

temperature. However, the circuitry operation described in the current claim, would be required when the waveforms of APA are combined with the device of Awamoto and Nagai.

In other words, when the waveforms of the APA are used to drive the device of Awamoto and Nagai, the controller would turn on the switching device in a first half of the set-up interval while turning off the switching device in a second half of the set-up interval thereby floating the common sustain electrode when a driving temperature inputted from the temperature sensor is said first prescribed temperature.

As shown above APA discloses, such a waveform in figure 5, floating common sustain electrode (Z set-up period).

Therefore it would have been obvious to replace the more than low temperature waveform of Awamoto with the driving waveform of APA and using the switching device of Nagai to implement the waveform for the benefit of improved contrast (APA, para. 20).

With respect to claim 14, Awamoto, APA and Nagai disclose, the driving apparatus as claimed in claim 11(see above).

While Awamoto and Nagai do not expressly disclose, wherein said controller turns on the switching device during the set-up interval when a driving temperature inputted form the temperature sensor is said second prescribed temperature. However, the circuitry operation described in the current claim, would be required when the waveforms of APA are combined with the device of Awamoto and Nagai.

In other words, when the waveforms of the APA are used to drive the device of Awamoto and Nagai, the controller would turn on the switching device in during the set-up interval when a driving temperature inputted from the temperature sensor is said second prescribed temperature.

As shown above, APA disclose, such a waveform in figure 3, with ground voltage (Z set-up period).

Therefore it would have been obvious to replace the second prescribed temperature waveform of Awamoto with the driving waveform of APA and using the switching device of Nagai to implement the waveform for the benefit of reduction of brightness misfires (APA, para. 33) and to hold the electrodes at ground when not driving the panel (Nagai, col. 12, lines 19-20) to obtain the invention as specified in claim 14.

With respect to claim 15, Awamoto, APA and Nagai disclose, the driving apparatus as claimed in claim 11 (see above).

Awamoto further discloses:

a sustain driver for driving the common sustain electrode (66 in fig. 3);

a scan driver for driving a plurality of scan electrodes provided in parallel with the common sustain electrode (67 in fig. 3); and

a data driver for driving a plurality of address electrode provided in a direction crossing the common sustain electrode (68 in fig. 3),

wherein said timing controller controls the sustain drive and the scan driver and the data driver (note fig. 3 and col. 6, lines 37-41).

With respect to claim 22, the only additional limitation this claim presents over its independent claim is that the first temperature is higher than the second temperature. Awamoto clearly states that one temperature range is higher than a preset value and one range is below that same preset value (col. 7, lines 3-8).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yokoyama (JP 2002-207449) discloses, applying a different driving waveform to a plasma display based on temperature. Yokoyama further discloses, lengthening or shortening the initialization pulses based on temperature (para. 23; fig. 8).

Yokunaga (US 6,630,796) also discloses, applying a different driving waveform to a plasma display based on temperature. The disclosure in column 15, line 52 – column 16, line 15, which discusses altering the reset pulse waveforms alone.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William L. Boddie whose telephone number is (571) 272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowtiz can be reached on (571) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wlb
2/28/07

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